

CLAIMS

WHAT IS CLAIMED IS:

1. A valve unit to be arranged in an ink supply channel of an ink recording apparatus, the valve unit comprising:
 - an entry port constructed to receive an ink needle and supply ink to the ink needle for use in recording;
 - a valve mechanism adapted to be disposed in the ink supply channel defining an upstream side and a downstream side in the ink supply channel;
 - said valve unit constructed to selectively permit and prevent the flow of ink without being pierced by the ink needle; and
 - a filter disposed upstream from the valve mechanism.
2. A valve unit to be arranged in an ink supply channel of an ink recording apparatus, the valve unit comprising:
 - a valve mechanism adapted to be disposed in the ink supply channel defining an upstream side and a downstream side in the ink supply channel; and
 - a filter disposed upstream from the valve mechanism;wherein the valve mechanism is constructed to selectively open and close the ink supply channel as a result of a change in the pressure difference between the upstream side and the downstream side of the valve mechanism.
3. A valve unit to be placed in an ink supply channel of an ink-jet recording apparatus, the ink supply channel having an upstream portion and a downstream portion, the valve unit comprising:

a partition wall which, when the valve unit is placed in the ink supply channel, is located between the upstream portion and the downstream portion, the partition wall having an upstream side and a downstream side and a plurality of communication holes passing therethrough, each said communication hole providing fluid communication between the upstream portion and the downstream portion; and

a diaphragm valve, comprising,

a valve seat formed on the downstream side of the partition wall, and

a flexible diaphragm, the diaphragm having an opening therethrough, the flexible diaphragm being mounted so that the opening presses against the valve seat until a pressure difference across the valve reaches a predetermined value.

4. The valve unit of claim 3, wherein at least a first and a second of the communication holes are located on opposite sides of the valve seat.

5. The valve unit of claim 4, wherein the first and the second communication holes and the valve seat all lie on a line.

6. The valve unit of claim 3, wherein the valve seat is kept in elastic contact with the opening.

7. An ink cartridge comprising:

a container;

a partition wall disposed within the container and dividing the container into an upper portion defining an ink chamber and a lower portion, the partition wall having an

upstream side and a downstream side and a plurality of communication holes passing therethrough, each said communication hole providing fluid communication between the upstream portion and the downstream portion; and

a diaphragm valve, comprising,

a valve seat formed on the downstream side of the partition

wall, and

a flexible diaphragm, the diaphragm having an opening therethrough, the flexible diaphragm being mounted so that the opening presses against the valve seat until a pressure difference across the valve reaches a predetermined value.

8. The ink cartridge of claim 7, wherein at least a first and a second of the communication holes are located on opposite sides of the valve seat.

9. The ink cartridge of claim 8, wherein the first and the second communication holes and the valve seat all lie on a line.

10. The ink cartridge of claim 7, wherein the valve seat is kept in elastic contact with the opening.

11. An ink tank unit for detachable mounting on a connecting member of an ink jet recording apparatus and which can contain an ink, the ink tank unit comprising:

a container having a partition wall that defines and separates a first ink accumulating chamber and a second ink accumulating chamber, the partition wall having an upstream side facing the first ink accumulating chamber and a downstream side facing the second ink accumulating chamber, said partition wall having a plurality of communication

holes allowing fluid communication between the first ink accumulating chamber and the second ink accumulating chamber;

a diaphragm opposing the downstream side of the partition wall and defining a third ink accumulating chamber between said diaphragm and said partition wall and located within said second ink accumulating chamber, said diaphragm having an opening;

a projection formed on the downstream side of the partition wall and aligned with and against said opening so that when a part of the diaphragm moves away from the partition wall said opening is not blocked; and

an ink supply port leading to the second ink accumulating chamber and through which, when the ink tank unit contains ink, ink flows from the second ink accumulating chamber to the ink-jet recording apparatus.

12. The ink tank unit according to claim 11, wherein said projection is an integral protrusion of said partition wall.

13. The ink tank unit according to claim 11, wherein a distal end face of said projection contacts a part of said diaphragm surrounding said opening.

14. The ink cartridge of claim 11, wherein at least a first and a second of the communication holes are located on opposite sides of the projection.

15. The ink cartridge of claim 14, wherein the first and the second communication holes and the projection all lie on a line.

16. The ink cartridge of claim 11, wherein the projection is kept in elastic contact with the opening.

17. The selective ink supply system to be located in an ink container between an ink chamber containing an ink and an ink supply port downstream of the ink chamber through which the ink flows to an ink-jet recording apparatus upon which the ink container is detachably mounted, said system comprising:

a wall having an upstream side, a downstream side, and a plurality of communication holes allowing fluid communication between the upstream and downstream sides;

a projection formed on the downstream side of the wall; and

a diaphragm opposing the downstream side of the wall, said diaphragm having an opening that is aligned with said projection, said diaphragm being urged against the projection so that the opening is blocked, the diaphragm separating from said projection when a pressure difference across the diaphragm exceeds a particular value.

18. The selective ink supply system according to claim 17, wherein said projection contacts said diaphragm to define a space therebetween.

19. The selective ink supply system according to claim 17, wherein an outer periphery of said diaphragm is pressed against said wall.

20. The selective ink supply system according to claim 17, wherein at least a first and a second of the communication holes are located on opposite sides of the projection.

21. The selective ink supply system of claim 20, wherein the first and the second communication holes and the projection all lie on a line.

22. The selective ink supply system according to claim 17, wherein the projection is kept in elastic contact with the opening.

23. The selective ink supply system according to claim 17, wherein, when the selective ink supply system is located in the ink container, the communication holes are in fluid communication with the ink chamber, and said opening is in fluid communication with the ink supply port.

24. The selective ink supply system according to claim 23, wherein, when the selective ink supply system is located in the ink container, the ink flows from the ink chamber through the communication holes and then through the opening to the ink supply port.